

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-15 and 18 are pending in the present application. Claims 4 and 5 are amended by the present amendment.

In the outstanding Office Action, Claims 4 and 5 were objected to for informalities; Claims 1-15 and 18 were rejected under 35 U.S.C. §112, second paragraph for being indefinite; Claims 1, 6-9, and 11 were rejected under 35 U.S.C. §102(b) as being anticipated by Richardson (U.S. Patent No. 5,862,668); Claims 1-3 and 5 were rejected under 35 U.S.C. §103(a) as unpatentable over Bonciani et al. (U.S. Patent No. 5,660,044, hereinafter "Bonciani") in view of Richardson; Claims 4 and 18 were rejected under 35 U.S.C. §103(a) as unpatentable over Richardson in view of Goodrich et al. (U.S. Patent No. 6,094,904, hereinafter "Goodrich"); Claims 10, 12 and 14-15 were rejected under 35 U.S.C. §103(a) as unpatentable over Richardson in view of Goodrich and further in view of Carberry et al. (U.S. Patent Publication No. 2002/0078684, hereinafter "Carberry"); and Claim 13 was rejected under 35 U.S.C. §103(a) as unpatentable over Richardson, Goodrich, Carberry and further in view of Hayashi et al. (U.S. Patent No. 7,143,583, hereinafter "Hayashi").

Regarding the objections to Claims 4 and 5, these claims have been amended as suggested by the outstanding Office Action. No new matter has been added. Thus, it is respectfully requested this objection be withdrawn.

As no other claims have been amended and the amendment to dependent Claims 4 and 5 do not change the scope of the claims, Applicants respectfully submit that entry of this amendment after final under 37 C.F.R. §1.116 is in order.

The outstanding rejections of the claims on the merits are respectfully traversed for the following reasons.

Rejection of Claims 1-15 and 18 under 35 U.S.C. § 112, second paragraph

The outstanding Office Action indicated that it is not clear in Claim 1 what is being mixed with a fuel gas. Claim 1 recites “a series of pilot devices configured to premix the fuel gas.” It is noted that the standard for deciding whether a claim complies with the second requirement of 112, second paragraph, which was invoked by the outstanding Office Action, i.e., the claims particularly point out and distinctly claim the subject matter, is addressed by MPEP 2171. MPEP 2171 specifically states:

The second requirement is an objective one because it is not dependent on the views of applicant or any particular individual, but is evaluated in the context of whether the claim is definite - i.e., whether the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art.

Thus, the second requirement requires that the claim is clear to ***a hypothetical person possessing the ordinary level of skill in the art***. Having this standard in

mind, it is next discussed the claimed feature of a pilot device configured to premix the fuel gas.

The main reference used by the outstanding Office Action, Richardson, states in the Abstract that “[t]he main fuel injection modules are of the **premix type** so as to vaporise fuel. However, the pilot fuel injection modules are configured so as to function as both **premix** and airspray fuel injectors” (emphasis added). Further, the same reference states at column 3, lines 4-8 that modules 17 “are all of the **premix type**” and at column 5, lines 46-49, that “both the main fuel injection module **17** and the pilot fuel injection modules **18** function as **premix fuel injectors**” (emphasis added).

However, this reference does not define the meaning of a premix fuel injector as this reference assumes that one skilled in the art knows that a premix fuel injector is an injector that mixes an oxidant with fuel. The oxidant is generally air, but it may be oxygen or other gases. Therefore, it is believed that the claimed feature of “a series of pilot devices configured to premix the fuel gas” conveys to those skilled in the art, even without reading the specification, that the fuel gas is mixed with an oxidant, such as air.

In addition, it is noted that the specification specifically discloses at page 7, lines 10-14, that “the fuel gas is mixed with a turbulent stream of air” in the pilot devices 20, further clarifying the scope of the pilot device.

Therefore, it is respectfully submitted that the claims comply with the requirements of 35 U.S.C. §112, second paragraph, and this rejection should be withdrawn.

Rejection of the claims under 35 U.S.C. §102(b) as anticipated by Richardson

This rejection is respectfully traversed for the following reasons.

Independent Claim 1 is directed to a combustion system for a gas turbine. The combustion system includes, *inter alia*, a series of pilot devices configured to premix the fuel gas and create a series of corresponding pilot flames. Each of the series of pilot devices includes a sub-pilot device configured to inject pilot fuel gas into the respective pilot device and produce diffusion flames for stabilizing the pilot flame.

The outstanding Office Action takes the position that producing “diffusion flames,” as recited by Claim 1, is a desired result (see page 5, first three lines). Dismissing this feature as a desired result, the outstanding Office Action also fails to show this feature in Richardson.

1. Claiming the diffusion flames is not a desired result

Applicants respectfully submit that the claimed “diffusion flames” are not a desired result as suggested by the outstanding Office Action. The diffusion flame is defined by the specification, for example, in the paragraph bridging pages 2 and 3 of the originally filed specification. This paragraph specifically discloses that

this pilot fuel has not been previously mixed with comburent air, it burns in flames mainly controlled by the diffusion process of the fuel in the comburent air, which are consequently called diffusion flames.

Thus, diffusion flames are the result of burning the fuel without prior mixing the

fuel with an oxidant. By claiming that the sub-pilot device injects pilot fuel into a respective pilot device to produce diffusion flames is thus a fact, a consequence of not mixing the fuel with the oxidant prior to the flame front and not a desired result.

Therefore, it is respectfully submitted that the claimed “diffusion flames” are not a desired result as asserted by the outstanding Office Action and patentable weight should be accorded to this feature of the sub-pilot.

2. Richardson does not teach or suggest a sub-pilot that produces diffusion flames

Richardson discloses a double annular combustor for a gas turbine engine. As shown in Figure 2, the gas turbine engine has plural fuel injection modules 17 and plural pilot fuel modules 18. Figure 1 shows a more detailed structure of a pilot fuel module 18, which is identified by the outstanding Office Action to correspond to the claimed pilot device.

Each pilot fuel module 18, as disclosed in the paragraph bridging columns 3 and 4 of Richardson, “is provided with two supplies of liquid fuel.” The first supply is provided through a first passage 41 and the second supply is provided through a second passage 44. The fuel moves through the first passage 41 to a passage 42, orifices 43 and enters an annular passage 36. Additional fuel moves through the second passage 44 to a conduit 45.

The air supply to the pilot fuel module 18 is provided from the compressor 12. The second full paragraph on column 5 of Richardson explains that air flows through

vanes 37 and 38 to be mixed with the fuel provided by the first supply in the annular passage 36, "thereby in turn providing efficient mixing of the air with liquid fuel exhausted from orifices **43**." Additional air flows through an annular passage 46 to be swirled by the swirl vanes 49 before being mixed with the fuel from the second supply.

Thus, Richardson discloses both fuel supplies (which are considered by the outstanding Office Action as corresponding to the claimed pilot and sub-pilot devices) as being of premix type, i.e., the air is mixed with the fuel prior to combustion.

Therefore, Richardson is different from the combustion system of Claim 1, in which the sub-pilot is configured to produce diffusion flames.

In addition, Claim 1 recites "a premixing chamber for air which is mixed with the fuel injected from a series of holes creating a main central flame which is formed in a flame tube." The outstanding Office Action considers that module 17 of Richardson creates a main central flame. However, as shown by Figure 2, there are plural modules 17, disposed on a perimeter of the gas engine, each producing a corresponding flame. Thus, Richardson does not teach or suggest a main central flame but rather plural lateral flames.

Accordingly, it is respectfully submitted that independent Claim 1 and each of the claims depending therefrom patentably distinguish over Richardson.

Rejection of the claims under 35 U.S.C. §103(a) as obvious over Bonciani and Richardson

The outstanding Office Action recognizes on page 6, last full paragraph, that Bonciani does not teach or suggest a series of pilot devices and corresponding sub-pilot devices. To correct these deficiencies, the outstanding Office Action relies on Richardson. However, as already discussed above, Richardson also does not teach or suggest sub-pilot devices configured to produce diffusion flames.

Accordingly, it is respectfully submitted that independent Claim 1 and each of the claims depending therefrom patentably distinguish over Bonciani and Richardson, either alone or in combination.

The remaining applied art has also been considered but it fails to disclose the features discussed above as missing in Bonciani and Richardson. Thus, it is believed that all the claims patentably distinguish over the applied art.

Accordingly, in light of the above discussion and in view of the enclosed amendments, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested. If, however, there are any remaining unresolved issues that would prevent the issuance of the Notice of Allowance, the Examiner is urged to contact the undersigned at (540) 361-2601 in order to expedite prosecution of this application.

Respectfully submitted,
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